



Comparative study of extraarticular spine spine of scapula fractures treated with or if with compression plating vs or if with compression plating supplemented with TBW

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Abstract:

Aim: Comparative study of extraarticular spine of scapula fractures treated with or if with compression plating vs or if with compression plating supplemented with tension band wiring.

Materials and Methods: This study was undertaken in a group of 10 patients, between the age group 20 to 60 years. The patients included in this study were of the same age group, fracture type, and had no associated injuries. X ray and CT scan with 3D reconstruction was done to evaluate any displacement or comminution. Then they were divided into two groups, first one was treated by plate fixation only while second one by tension band wiring along with plate fixation. In both the approaches modified judet approach was used.

Results: Mean DASH score of 22.3 and better post operative shoulder rom was found in patients treated with compression plating and TBW compared to mean DASH

score of 18.3 found in patients treated and only compression plating.

Conclusions: After comparing internal fixation of spine of scapula fractures by two methods, Tension-band wiring with plate fixation and only plate fixation, tension band wiring with plate fixation was found to be a better treatment option.

Keywords: spine of scapula fracture, Tension band wiring, compression plating.

Introduction

Spine of scapula fractures is an uncommon fracture [1]. It can be simple closed fractures or may be complex open injuries. Spine of scapula fracture occur commonly due to high energy trauma and is frequently associated with spine, cranium and thoracic injuries.[2] And hence treatment varies from non-operative conservative management to surgery, with the main aim of damage control procedures and finally definitive fixation. Surgical treatment of an extraarticular scapular fracture is

gaining popularity with the advancement of surgical technique, new implants, and objective measurement to assist in decision making and to measure outcome (3-8). Currently, available literature has shown good outcome with open reduction and internal fixation of an extraarticular scapular fracture, where it is indicated (7,9,10). The aim of our study was to compare the outcome of compression plate fixations and compression plate fixation supplemented with tension band wiring.

Cole et al. [7] categorized surgical indications based on the degree of deformity and amount of displacement, identifying six operative indications for extraarticular fracture:

1. Medial/lateral displacement >20 mm
2. Angular deformity between the fracture fragments >45°
3. Medial/lateral displacement >15 mm and angulation >30°
4. Double lesion of superior shoulder suspensory complex (SSSC), with displacement >10mm in both lesions
5. Glenopolar angle <22 degrees
6. Open fracture

For surgical management, several approaches have been described with the aim of being more effective and less invasive [11]. a modified Judet approach was well described by Obrebsky and Lyman [12]. This approach provides a blunt dissection through the inter nervous interval between the infraspinatus and teres minor. The deloid and infraspinatus attached on the scapular spine are detached from their origin to gain access to the fracture site.

Materials and Methods

This study was undertaken in a group of 10 patients, between the age group 20 to 60 years. The patients

included in this study were of the same age group, fracture type, and reasons of their fractured spine of scapula. Then they were divided into two groups, first one was treated by plate fixation only while second one by tension band wiring along with plate fixation at our facility between October 2019 to august 2021. Patients were having restricted and painful shoulder range of motion.

Standard plain radiograph for all patients includes scapular anteroposterior (Grashey view) and lateral (Scapular Y view). CT scan with a 3D reconstruction of the fractured scapular was requested when a displaced scapular fracture detected on the plain radiograph. Displacement and angulation of the fractured scapular measured and recorded by the treating surgeon based on the CT-3D reconstruction as this is a more accurate method [8].



Figure 1



Figure 2

Inclusion criteria

- a) Patients from age of 20 to 60
- b) After initial trauma, there was spine of scapula fracture seen on x-ray and CT scan
- c) The patient presented within 1 week of trauma
- d) Extraarticular spine of scapula fracture

Exclusion criteria:

- a) Sepsis patient
- b) Associated other scapula fractures or any other fracture
- c) Patients treated conservatively
- d) Age > 60 years

Patients were followed up for 6 months and were assessed using the latest DASH score.

Interpretation of scores

0% to 20%: minimal disability:	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21%-40%: moderate disability:	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%: severe disability:	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled:	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
81%-100%:	These patients are either bed-bound or exaggerating their symptoms.

The study was conducted with the approval of the ethics review board of our facility, and written consent was obtained from each patient before inclusion in the study.

Surgical technique:

Patient with isolated scapular neck fracture were positioned in a semi-prone position, 45° lateral decubitus, with the fractured scapular facing upwards, and a small bolster placed in front to support the patient chest from falling flat on the operating table with the fractured scapula facing upwards, and a small bolster placed in front supporting the patient chest.

The ipsilateral arm draped and then entered into the surgical field to allow the arm used as a lever to mobilize the scapular when manipulation required to reduce the fracture.

We utilized a Modified Judet approach for scapular fracture reduction. It is essential to restore the anatomy of the scapular blade to prevent scapulothoracic joint disorder such as snapping scapular syndrome resulting from the abnormal articulation of the scapulothoracic joint (13). The Modified Judet approach allows similar access to essential landmarks for fracture reduction and fixation with lesser soft tissue stripping, particularly the infraspinatus muscle and its blood supply (6,14).

The fracture fixation is done by first passing the k wire to stabilize the fixation and then stable fixation done using 2 methods

1. Using locking compression plate
2. Using locking compression plate supplemented with tension band wiring by 20 no. SS wire.



Figure 3



Figure 4



Figure 5: Intra op picture of spine of scapula fracture treated with compression plating

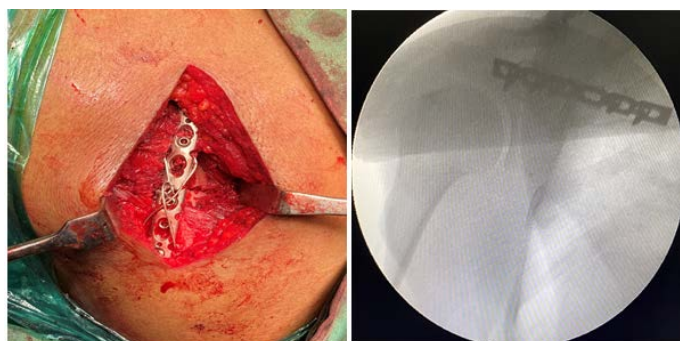


Figure 6: Intraop pic of spine of scapula treated with C -arm pic of fracture fixation Compression plating supplemented with TBW

Postoperative protocol

The post operative protocol was identical in all the patients irrespective of tenion band wiring was done or not

1. Upto 3 weeks postoperatively, the patient is given a shoulder arm immobilizer and is adviced a standard pendulum exercises, elbow forearm and wrst ROM.

2. After three weeks, the shoulder arm pouch is discontinued, and the patient is adviced to do flexion up to 160 degrees, with restricted external rotation up to 30 degrees and internal rotation up to 45 degrees for the next three weeks.

3. After six weeks, all range of motion is started with resistance training in the form of 2kgs weights, and resistance tubing is to achieve full range of motion by eight weeks.

4. At three months, full weight training was allowed, and those not having throwing activity in sports were allowed to return to sports training, and those athletes with throwing sports were allowed to return to sports by six months.

5. All patients were followed up at an interval of 3 weeks for the first six months, followed by every three months for the next 4 follow up and then every six months for a minimum time of 2 years in total.

At each visit of the patient, we evaluated the patient by

1. Evaluating a range of motion
2. DASH score was assessed
3. Patient was clinically assessed by asking the patient to do shoulder range of motion
4. A standard shoulder radiograph was taken.



Figure 7: Post-operative x-ray

Results

Average waiting time of surgery was 3 days (range 1–6). All patients achieved radiological union during the one-off assessment (6–24 months after surgery). All patients returned to work. None of the patients developed post-operative complications such as infection, non-union and failure of internal fixation at time of assessment.

The patient-reported outcome was measured using the DASH score. The mean DASH score in our group of 10 patients, is 19.3 (ranging between 1.7 and 39.3) of which mean dash score in patients of spine of scapula fracture treated with compression plating and tension band wiring was 22.3 and those treated with isolated compression plating was 18.3.

The ROM and strength of the injured shoulder were measured and recorded. These values were compared to the uninjured shoulder. The functional outcome of surgery in the injured upper limb stated as a percentage of the uninjured upper limb ROM or strength. The average range of motion of the operated shoulder produced 90% (forward flexion), 80% (abduction), and 70% (external rotation) of the same average range of motion of the uninjured contralateral shoulder. The average strength test yield was 80% (forward flexion), 76% (abduction), and 65% (external rotation) of the average strength of the uninjured shoulder.

The small sample size made impossible for a statistical analysis to be done in our group of patients, hence we were unable to comment on the significance of our observed differences.

Discussion

The present study aimed to evaluate the post operative outcome of scapula neck fractures treated with open reduction and internal fixation with compression plating vs compression plating supplemented with tension band

wiring. In our study, the mean, abduction, forward flexion, and external rotation in the injured limb treated with open reduction and internal fixation with compression plating supplemented with tension band wiring were found to be 94, 97, and 86% respectively. The injured shoulder strength treated with only compression plating were recorded average abduction of 83%, forward flexion of 73%, and external rotation of 73%. None of the 22 patients developed post-operative complication such as infection, non-union or failure of internal fixation.

In our study, the mean range of motion (ROM) in the injured shoulder were 114° of abduction, 157° of forward flexion, and 42° of external rotation.

We reported mean DASH score of 22.3 (range 1.7–39.3) in our patients treated with compression plating supplemented with tension band wiring. And a mean dash score of 18.3 observed in patients treated with compression plating only. A DASH score between 0 and 29 is considered to be the point where the patient no longer considers their upper limb disorder is a problem (15).

Our study has limitations. The sample size is small and consist of only patients treated operatively and comparison was made with the contralateral uninjured shoulder within the same patients. Patients who were treated conservatively were not included. We therefore were unable to compare the functional outcomes between patients treated operatively and conservatively.

Conclusion

In conclusion, this study shows that scapula neck fracture patients treated with compression plating supplemented with tension band wiring is superior to isolated compression plating.

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